



RENEWABLES FOR SUSTAINABLE
VILLAGE POWER

PROJECT BRIEF

NREL Wind Technical Assistance to Mexico Renewable Energy Program

by David Corbus 7/98

Background

The Mexico Renewable Energy Program helps expand the use of renewable energy, primarily PV and wind, in rural, off-grid applications. The program is co-sponsored by the U.S. Department of Energy (DOE) and USAID and managed by Sandia National Laboratories, with the National Renewable Energy Laboratory (NREL) providing technical assistance for wind projects. The project approach emphasizes sustainability and the development of in-country institutional capacity.

The NREL program team is working with Mexican organizations within established and funded programs to incorporate the use of renewable energy technologies where they are the best technical and economic solution. The team provides training and technical assistance to the pilot project staff to help to institutionalize the use of renewable energy technologies in Mexico.

Scope

Program goals are to increase the demand for the appropriate and sustainable use of renewable energy technologies, thereby expanding markets for the U.S. renewable energy industry, and to increase the use of renewable energy technologies as a mechanism for combating global climate change, specifically by reducing greenhouse gas emissions.

More than 200 photovoltaic systems and several wind energy systems have already been installed, including a 10-kW wind-diesel system for an eco-tourism resort. Significant near-term replication of these projects is under way with the Fideicomiso de Riesgo Compartido (FIRCO, a federal, shared-risk trust fund that is under Mexico's agriculture department), the major program partner. FIRCO is working to set in motion one of Mexico's largest agricultural development programs, and Sandia and NREL are providing technical assistance as FIRCO begins to install hundreds of renewable energy projects (mostly for water pumping).

The Mexico program is divided into specific program areas and crosscutting activities that include work with FIRCO at both

the state and national levels. The program also has projects with several state agencies in Chihuahua, Sonora, Baja California Sur, Quintana Roo, Oaxaca, Veracruz, and others. In addition, cooperative projects are underway with Conservation International, the Nature Conservancy, World Wildlife Fund, and several local organizations to incorporate renewable energy into ongoing activities for protected-areas management in Mexico. The program's crosscutting activities include solar and wind resource assessment, training, technical and economic analysis, financing mechanisms, industry interactions, project monitoring and evaluation, and environmental assessments.

NREL's approach is to *emphasize sustainability and infrastructure by*

- working with established Mexican organizations
- working within established and funded programs
- providing training in technologies, applications, and project implementation
- providing technical assistance and cost-shared funding for pilot projects.

Emphasis is on productive uses such as water pumping for livestock or crop irrigation, lighting for commercial or business activities, and ecotourism. Such uses

- provide economic and social benefits
- have a high degree of sustainability and replicability because they provide a mechanism for paying for renewable energy systems
- compete with subsidized renewable energy programs in Mexico.

NREL Activities

NREL is helping Mexico in site identification and providing technical assistance to their wind project teams.

Oaxaca Workshop and 1.5-kW Turbine Installation. NREL participated in the Mexico/AID Renewable Energy Workshop

held in Oaxaca in August of 1996. Besides presenting material on wind-powered water pumping and hybrid system design, NREL trained others in the installation of the 1.5-kW wind-powered water pumping system.

10-kW Costa de Cocos Wind-diesel Installation. The work at Costa de Cocos consisted of prefeasibility and economic analyses, preliminary design, preparation of bid specifications, evaluation of bids, coordination between the vendor and owner on project implementation, participation in project implementation, and follow-up evaluation of the project, including analysis of monitoring data.

San Juanico Analysis. Working closely with Arizona Public Service (APS), NREL has done extensive economic and performance modeling of a proposed hybrid system for the village of San Juanico. Their activities include: tariff structure definition; assessments of ability to pay; loads analysis; site visits and dialogue with villagers; preliminary design studies based on Commission Federal de Electricidad (CFE) and APS cost requirements; extensive meetings with APS and CFE and other interested parties; and time-series modeling of system performance using estimated hourly loads and hourly anemo-meter data from the site. The installation of this project should be complete by January 1999.

Wind and Solar Resource Assessment. The NREL resource assessment team analyzed both wind and solar data for Mexico and is producing a catalog of Mexico wind data from various sources. They also are producing wind resource maps for several regional areas. Two important activities were the acquisition of digital terrain data for all of Mexico and the analysis of satellite data on ocean wind speeds near the Gulf, Caribbean, and Pacific coasts.

Besides these activities, NREL conducted assessments of a wind/PV/diesel hybrid system in Quintana Roo for the fishing lodge of Casa Blanca, analysis of several wind-powered water pumping sites in Quintana Roo, and analysis of potential protected-areas management projects in the states of Quintana Roo and Yucatan.

Planned Activities

San Juanico Hybrid System. NREL will continue technical analysis for the San Juanico Hybrid power project. The work will include technical system design assistance and design of a monitoring system for the project. Technical Assistance in the Yucatan. NREL is providing technical assistance to several small wind projects in the Yucatan Peninsula, including small wind/PV system installations at the Isla Contoy and Pez Maya nature reserves.

Replication of FIRCO Water Pumping Activities. NREL will continue to support the FIRCO water pumping projects with the goal of replicating wind-powered water pumping systems in an area with a good, homogenous wind resource such as Oaxaca.

Wind Resource Assessment. NREL will produce a catalog of all wind monitoring activities under the program. Researchers have completed a set of detailed, computerized wind resource maps of two regions of Mexico: the Yucatan Peninsula and Baja California Sur. These maps were generated using automated wind mapping systems.

NREL will continue technical assessments, prefeasibility analysis, and site visits for wind projects that pass initial screening by project team members in the field. Several small wind projects are being evaluated in the Yucatan Peninsula.

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